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NORWAY'S AGRICULTURE

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Norway is in reality a huge rock, portions of which, thru eons of time, have developed forests and soil. Only three per cent of Norway's surface is cultivable. A large part of even this three per cent required arduous labor before it could be made to produce agriculturally. Because of this small percentage of arable land and the geographic ruggedness of the country, it is probable that the importance of Norwegian agriculture is not generally realized.

Agriculture and fishing were the earliest means of subsistence in this country, both being natural geographical pursuits. Known Norwegian agriculture dates back more than a thousand years B.C. Up to 1800, about eighty per cent of Norway's population derived a livelihood from the soil. About thirty per cent stlll live by agriculture. A visitor to Norwegian agricultural areas will find the agriculture of the country unique and the philosophy of the farm people refreshing.

The purpose of this article is to give a general picture of agriculture in Norway. The geographical setting is briefly described; the crops and livestock suitable to the setting are shown; different phases of the life of the farm people are mentioned. Most of the subject matter was derived from personal contacts in Norway during the summer of 1934. The statistical data and charts are based upon the official statistics of the country as reported in the fifty-third issue of the Statistisk Arbok of September, 1934.

NORWAY'S LOCATION AND SURFACE

Norway is located between 58° and 71° north latitude, and has almost exactly the same latitude as Alaska. Nearly one-half of the length of the country is north of the Arctic Circle. The total area, exclusive of Spitzbergen, is about 125,000 square miles, and is slightly smaller than our two states of Minnesota and Iowa.

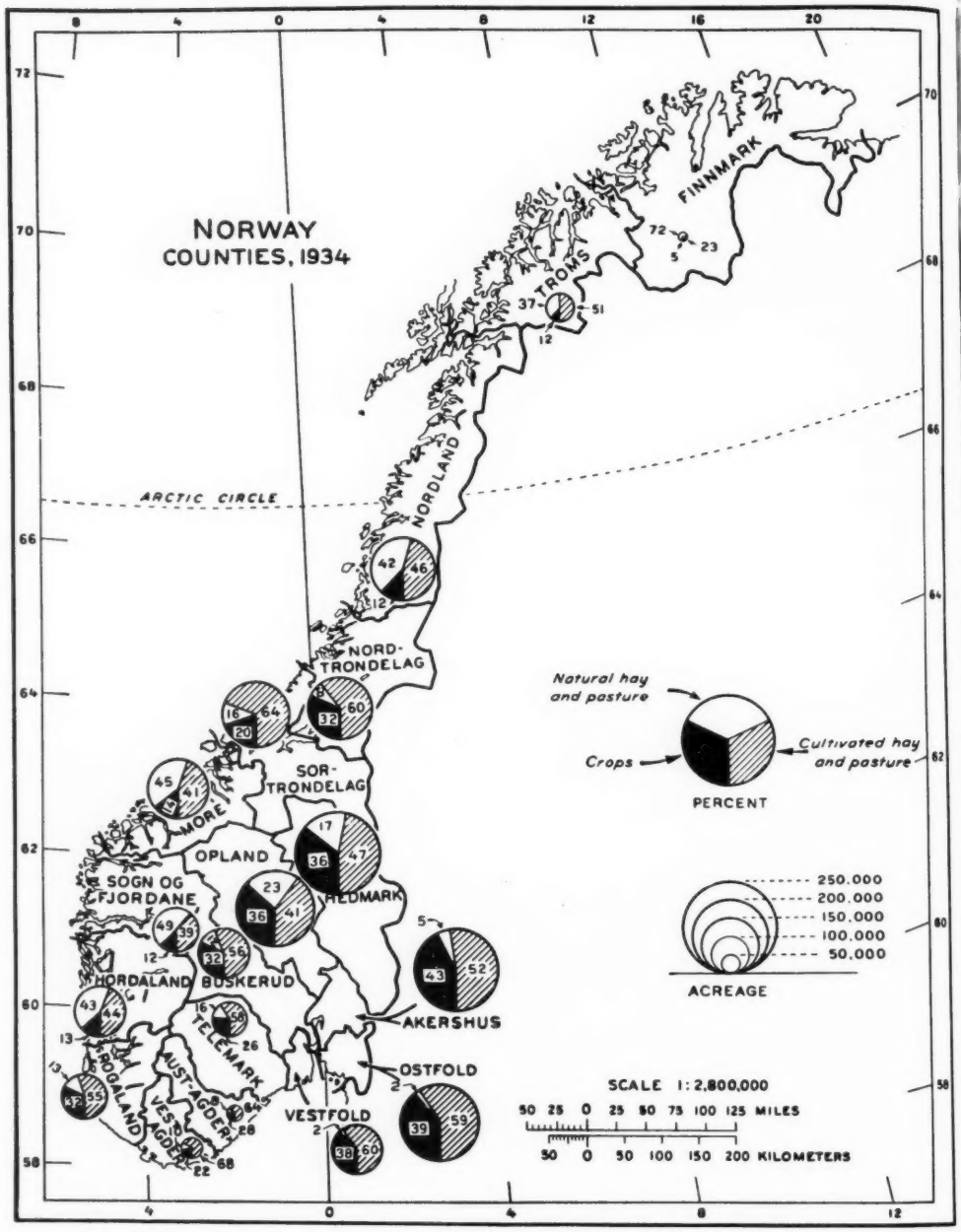

FIG. 1. Distribution of cultivated land. The extent of the three per cent of Norway's area classed as cultivable in each county is indicated on this map. Data are for the crop year 1933, in which year the crop area was 694,000 acres; the cultivated hay and pasture area 1,298,000 acres; the natural hay and pasture area was 506,000 acres. No part of the eight per cent of Norway's area classed as pasture (largely upland) is shown.

About one-fourth of this area is islands. There are said to be 150,000 islands along Norway's west coast ranging in size from a few square feet to one of 870 square miles in the Lofoten group north of the Arctic Circle. Norway is about 1,100 miles long, in a straight line north and south and following the indentations of the coast, it is about 1,700 miles. From east to west it is about 250 miles wide in the southern part, while toward the north it is from 60 to 80 miles wide.

Norway is a mountainous country. The coast line stands out in bold relief and is about 1,500 feet in height. A few peaks in the Kjolen mountains are between 5,000 and 6,000 feet in height. The slopes are steep, and the land is rugged. Of Norway's surface sixty per cent is classed as bare, rocky mountains; twenty-one per cent is forest, pine, spruce, and birch; eight per cent is grazing land; four per cent is lakes; four per cent is ice fields; the remaining three per cent is agricultural land. There is the possibility of converting about one per cent more into agricultural land, but the clearing would be costly and the yields would probably be unsatisfactory.

CLIMATE AND RAINFALL

No other country in the world with a similar latitude has such a temperate climate. This is largely due to the moderating effect of the Gulf Stream Drift. Equitable temperatures prevail. The January temperature along Norway's west coast does not vary greatly from 32° F., while the July temperature in the same area is about 58° F. The January temperature in the eastern area is lower than that of the coast, while the July temperature for the eastern part of the country is higher than that of the coast.

The annual temperature, and temperature by months for 1933, at specified places on the West Side, from Bergen in the south to Vardo beyond the North Cape, and on the East Side of Norway, from Roros in Sor-Trondelag County to the southern part, are given in the table at the top of page 168. Average annual temperatures over a period of years are also given.

Along Norway's west coast, rainfall is heavy. Along the southern part of the coast where the altitude is greater, the rainfall is about 73 inches annually, while farther north it is about 40 inches. In the vicinity of Bergen, it rains about 200 days during the year, but this does not necessarily mean that the sun does not shine during those 200 days. Showers and sunshine are more often inter-

	West Side at—					East Side at—			
	Bergen	Laerdal	Trondheim	Bodo	Vardo	Roros	Hamar	Oslo	Oksoy
1933				(Degrees Fahrenheit)					
Jan.	37.8	35.1	32.7	33.4	27.3	22.2	25.7	28.0	34.0
Feb.	33.6	30.6	25.3	23.7	22.1	14.4	23.4	27.7	32.2
March	40.3	35.2	33.1	29.5	22.5	24.8	30.2	33.3	35.2
Apr.	42.1	41.5	37.4	33.3	28.8	29.5	37.9	41.9	41.9
May	52.3	53.4	47.5	43.7	35.8	40.8	47.8	51.3	49.1
June	62.6	64.8	60.8	55.2	43.3	54.1	62.6	65.3	61.2
July	60.8	63.9	59.9	55.8	49.5	55.0	63.0	66.6	64.2
Aug.	57.9	58.1	55.6	54.9	50.0	49.6	58.6	61.5	60.3
Sept.	55.9	52.9	51.6	51.3	45.1	45.1	51.3	55.2	57.2
Oct.	47.1	45.1	41.4	41.0	36.1	33.8	41.4	44.6	48.6
Nov.	39.0	32.2	30.4	33.8	30.6	17.2	27.1	33.1	37.9
Dec.	37.8	30.4	32.5	32.2	26.1	19.9	18.9	25.2	33.8
Annual 1933	47.3	45.3	42.4	40.6	34.7	33.8	40.6	44.4	46.2
Average 1861–1920	44.6	43.5	40.5	38.7	33.3	31.3	38.1	42.4	45.0

	West Side at—					East Side at—			
	Bergen	Laerdal	Trondheim	Bodo	Vardo	Roros	Hamar	Oslo	Oksoy
1933					(Inches)				
Jan.	5.6	.8	2.3	1.9	1.1	1.1	.9	1.9	2.8
Feb.	8.1	1.7	3.4	2.5	1.2	1.4	1.1	1.9	3.2
March	4.2	.4	2.9	5.7	6.1	.6	1.1	1.2	3.1
Apr.	4.7	.5	2.4	3.1	1.4	.9	.2	.5	.1
May	1.0	.6	.4	.5	.6	.6	1.3	1.3	1.1
June	1.0	.4	.3	.7	.4	.8	1.2	2.4	4.7
July	8.6	3.9	4.5	2.5	3.0	4.9	3.2	2.6	2.3
Aug.	10.1	2.8	6.0	3.5	.9	4.2	2.2	2.6	3.1
Sept.	2.7	.8	2.0	4.6	2.0	1.0	1.5	1.3	1.5
Oct.	5.8	1.0	5.1	5.9	2.1	.9	3.9	6.1	6.0
Nov.	2.9	.7	2.0	5.4	3.5	.8	.3	.2	1.4
Dec.	3.9	.4	4.2	6.2	4.2	1.8	.4	[1]	.3
Annual 1933	58.6	14.0	35.5	42.5	26.5	19.0	17.3	22.0	29.6
Average 1876–1925	73.4	18.1	31.1	35.4	25.8	18.0	20.5	25.4	34.0

[1] Less than one-tenth of one inch.

mittent, and farm processes go on between the showers. Over the mountains on the eastern slopes, the annual rainfall is about 30 inches. The lower table on page 168 gives the annual precipitation, and precipitation by months for 1933 at specified places. An average over a period of years is also given.

THE FARMING AREAS

The farming areas are widely scattered and made up of small irregular tracts. The best and most fertile areas are found along rivers, lakes, and fjords. The exception to this is the farming area in the eastern part of the country extending north of Oslo where is a tract of about 450 square miles of relatively smooth land.

The West Side—or west coast farming area—is characterized by smaller and usually more irregular farms; a more prevalent combination of farming and fishing; fewer grain crops; smaller farm equipment; and smaller, tho comfortable, farm homes. Much of the farm work is done by hand. Many of these farms are island farms, thus necessitating boats as a mode of travel and communication with the mainland. Also, this area has numerous indentations of the sea making boat travel far inland possible. Many boats used by the farmers are row boats, while others are propelled by motor.

The East Side—or interior farming area—is characterized by larger farms; more grain crops; greater production of fruits and truck crops; a more prevalent combination of farming and forestry; the use of more farm equipment; larger and more comfortable homes. The usual mode of travel is the horse-drawn vehicle.

In all parts of these areas the soil is thin and contains much sand and clay. Much fertilization is necessary, but Norway also produces much fertilizer—synthetic nitrate and fish meal predominating. The growing season of about four months is enhanced by the fact that the northern two-thirds of Norway is in the land of the "midnight sun," and experiences the summer of continual daylight. Even in the southern part of the country twilight asserts itself all night during the summer.

In these farming areas are located more than a quarter of a million farms, and from these farms approximately thirty per cent of Norway's present population of 2,858,000 derives a livelihood. More than ninety per cent of these farms are less than ten acres in size. Fifty acres is a large farm. There are but few farms more than fifty acres in size.

CROPS AND LIVESTOCK

Norway produces crops similar to almost any other country producing agricultural products, but because of the small amount of agricultural land, the amounts produced are necessarily limited. Oats, barley, potatoes, turnips, wheat, rye, kohl-rabi, peas, and hay are produced in every county in the country, except the two northernmost ones, Troms and Finnmark. In the two northernmost counties the crops are limited to barley, potatoes and hay crops. Potatoes always mature in these northern counties, and in favorable seasons, barley ripens up to the northernmost point of the country (Figs. 1 and 2).

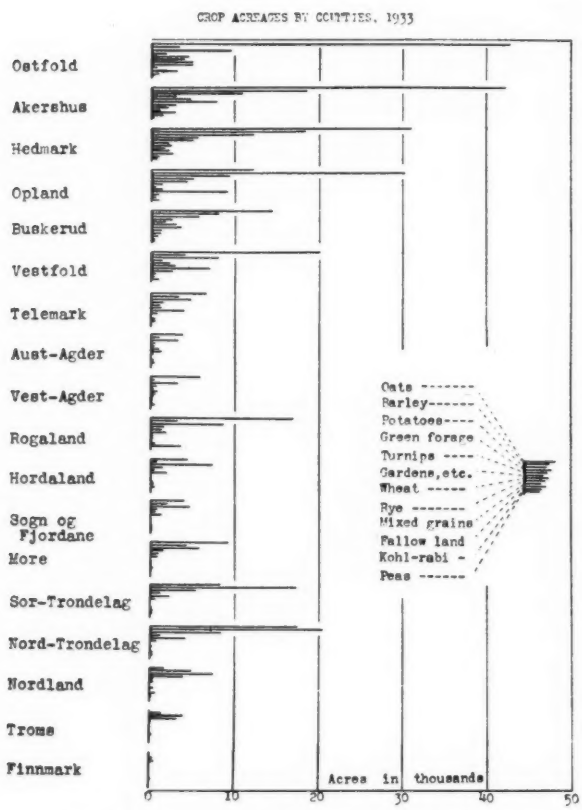

FIG. 2. Crop acreage by counties, 1933. Crops are arranged in order of number of acres in the country as a whole, largest to smallest. All crops are grown in all counties, except Troms and Finnmark, but in a few instances the acreage is too small to be indicated on the chart.

Of none of these crops, with the possible exceptions of potatoes and hay, is enough produced for consumption within the country. Norway is on an import basis for agricultural products. In some years a few potatoes are exported, but the amount is insignificant.

However, Norway can expand production to a limited degree to meet an emergency. This was proven during the World War. After the war, there was a recession, but production of none of the leading grain crops, except rye, ever returned to a pre-war level.

These facts are brought out in the following table, which shows production over a period of years.

The domestic livestock of Norway consists of horses, cattle, pigs, sheep, goats, rabbits, reindeer, and chickens. Bees (Census 1929) are also kept in practically every county in the country.

Year	Wheat	Rye	Barley	Oats	Potatoes	Hay
	1,000 *bushels*	1,000 *bushels*	1,000 *bushels*	1,000 *bushels*	1,000 *bushels*	1,000 *short tons*
1914	269	1,045	2,591	9,325	24,943	3,238
1915	284	829	2,821	12,022	18,589	2,873
1916	316	942	3,592	15,735	29,189	3,390
1917	430	1,159	4,021	17,004	39,700	2,785
1918	1,087	1,012	5,622	16,582	28,954	1,858
1919	1,071	983	5,274	15,106	37,912	1,891
1920	999	970	5,382	15,078	31,076	2,076
1921	972	1,043	4,279	12,960	25,995	2,023
1922	643	862	4,483	13,380	32,699	2,267
1923	587	742	3,282	7,999	24,269	2,222
1924	493	637	4,692	10,641	21,517	2,821
1925	490	614	5,180	12,048	34,500	2,677
1926	586	647	5,125	13,332	32,870	2,563
1927	605	606	4,672	12,665	22,232	2,740
1928	798	497	5,133	12,680	34,933	2,294
1929	750	538	4,533	12,147	33,070	2,588
1930	720	556	4,922	13,621	28,144	2,955
1931	592	378	4,207	9,494	28,451	2,800
1932	749	522	5,433	13,328	38,030	2,704
1933	755	438	4,597	12,416	35,890	2,246

The horses of Norway are small and stocky, suited particularly to the vehicles used on the narrow crushed-rock roads and to the types of machinery used on the farms in this rugged country. The cattle are mostly milk cows; pigs are kept for home consumption, tho any surplus is sold; sheep supply wool and mutton; goats supply milk; rabbits are kept for food and for their skins. The herds of reindeer in the northern counties supply food, clothing, and transportation for the Laplanders in those counties. In 1933 there were in Norway 180,183 horses; 1,339,833 cattle; 1,764, 050 sheep; 343,042 goats; 317,207 pigs; and 3,543,658 chickens. The 1929 census enumerated 186,785 rabbits and 111,032 reindeer (Fig. 3).

The summer pastures for livestock are far into the uplands. Here the cattle, goats, and sheep are driven to be pastured during the summer months. Here a summer home is established for those who will tend the herds and make the winter's supply of cheese and

butter for the family. The girls and boys who tend the herds lead a wholesome, healthful outdoor life. In the late fall all stock is brought down to the farms where it is barn-fed thru the winter months.

Farmers sell milk and cream to factories which produce cheese and butter. These factories export condensed milk, cheese made from both cow's milk and goat's milk, and butter. Eggs are also exported.

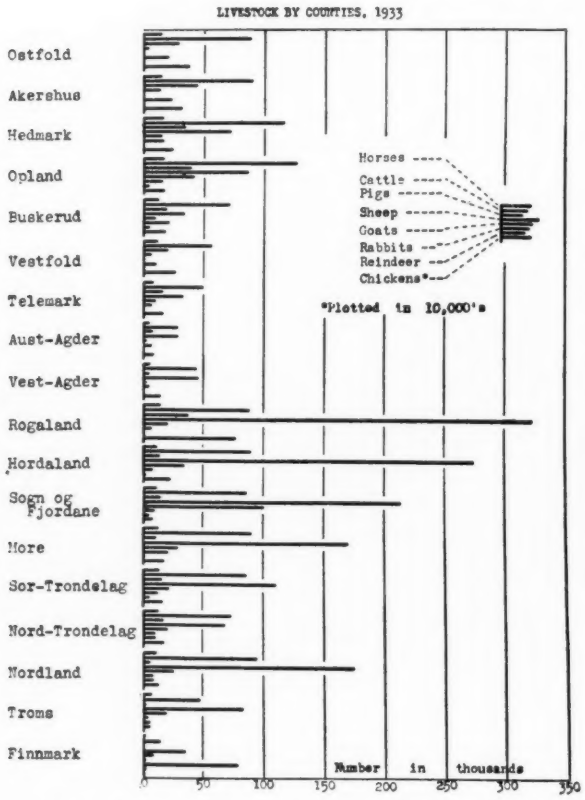

FIG. 3. Livestock by counties, 1933. All classes of livestock, except reindeer, are kept in all counties, but in a few instances the number is too small to be indicated on the chart. Reindeer are not kept in the seven southeastern counties. The numbers of rabbits and reindeer are from the census of 1929.

Other exports which are produced on Norway's farms are cow hides, calf skins, sheep skins, and goat skins. Exports of these, together with the dairy products, amounted to about three million dollars in 1933.

VEGETABLES AND FRUITS

Practically every farm, and many village homes, have gardens in which are produced peas, leeks, celery, parsley, beets, turnips, rhubarb, cucumbers, tomatoes, cabbage, carrots, and beans. All of these vegetables are produced in every county as far north as Hordaland. Many of them are grown in small quantities as far north as Troms. Gardens in Finnmark hardly exist, as only four acres were reported devoted to gardens in the entire county in 1933. The vegetables are consumed within the country.

The fact that this country on the Arctic Circle produces fruit, is

unknown to many. The official census of June 20, 1929, reports more than a million apple trees; more than a quarter of a million pear trees; more than a half million plum trees; more than a half million cherry trees. These trees produced in 1933, apples, 1,479,000 bushels; pears, 155,000 bushels; plums, 289,000 bushels; cherries, 184,000 bushels. These fruit trees are grown as far north as More County, and a few even farther north. As is to be expected, most of them are in the more southern counties.

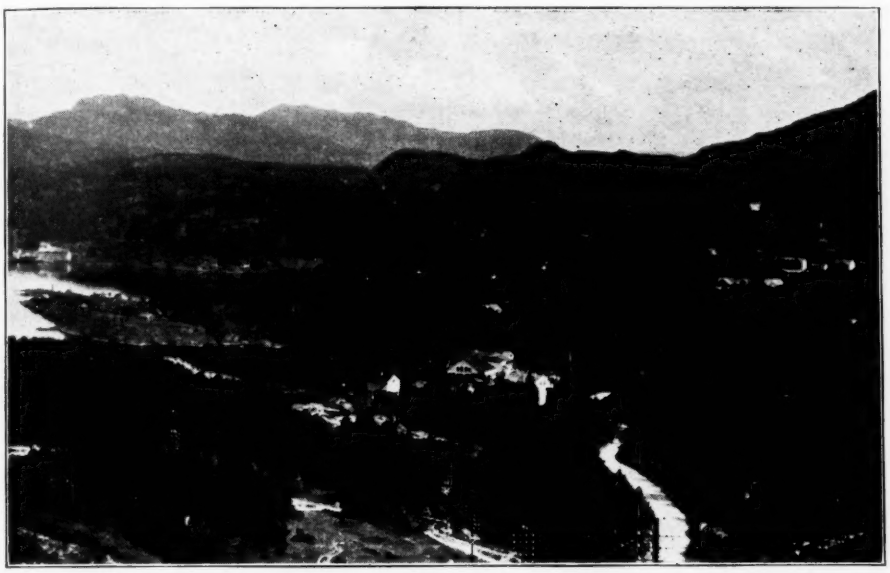

FIG. 4. Near Bergen. This view presents typical farm land in this locality. Crushed rock roads lead into the farming areas. Electricity is brought to fully two-thirds of Norway's farms.

The berries grown are strawberries, raspberries, gooseberries, red currants, and black currants. The berries are also grown chiefly in the southern and eastern counties, tho some are grown in the more northern counties. It is rather interesting that the census referred to above reports 68 red currant bushes, 2 gooseberry bushes, and 2 black currant bushes in Finnmark, the northernmost county. The fruits and berries, as well as the vegetables, are largely consumed in the country. The fact that these fruits and vegetables can be grown in Norway, emphasizes Norway's moderate climate with no extremes of heat or cold.

For fear this discussion of production on Norwegian agricultural land might appear too glowing, one must add that seasons

from year to year differ there as every place else. The greatest drawbacks, however, seem to be the possibility of a late spring and an early freeze. Either of these would materially affect the maturity and the yields of the various crops.

FARM LABOR

Norwegian farming thru the centuries has been a stern and severe task. First there was the selection of the most promising tracts. Even upon these most promising tracts, much hard labor had to be performed—labor by might of hand and physical endurance. Forests had to be cleared by man power; boulders had to be removed by man power. Each year, over long periods of time, rocks, which seemed to grow out of the thin soil, had to be removed from many areas. These early conditions of the agricultural land necessitated some type of farm labor. Thus, back in the ages developed the "husmannsplass." Some person more enterprising than another took this virgin farm land. In order to get help to make it productive, he offered a small house and a small plot of ground to a "husmann" and his family, the "husmannsfolk," in return for a specified amount of work on the owner's farm each year. Year in and year out the "husmann" and his family worked at arduous, back-breaking tasks. In no case was the wage more than a few cents a day. Seldom did a "husmann" become well enough off for an independent undertaking; he was always sure of a place to stay.

But this form of farm labor is practically a matter of history now. Indeed it is rather difficult to find examples of this Norwegian type of people. Much legislation has been indirectly opposed to this type of farm labor, and most farm owners have voluntarily released their "husmannsfolk" from work under the old terms.

Farm labor now, other than family labor, is hired by the month. During the summer of 1934, the approximate monthly wage was sixty crowns, or about fifteen American dollars. Horses do all the heavy work, and here it might be said that a team indicates rather large scale farming. On only a few farms in Norway is a tractor used for field work. On fully two-thirds of Norway's farms electricity furnishes not only light and power for household appliances, but also farm power.

Women do work in the fields, but it seems fun rather than toil. Few old women are seen working outdoors anymore, and the young

girls seem to make sport of their work. They always have time to wave to a passer-by and never seem to work in the field all day, for if one passes the same place in the afternoon, these same girls will be sitting outside at home busied with handwork. Rather, this exercise in God's open fields seems most health-giving.

A TRADITION

A farm in Norway is a family tradition. The oldest son becomes owner at the death of his father. Often times he takes over the

FIG. 5. Large-scale farming. Typical farming land in Norway's richest agricultural section about one hundred miles north of Oslo, is shown in this picture. A mower and team harvest this rye field.

management of the farm long before he inherits it. Most sons look upon the inheritance of a Norwegian farm as an honor and a privilege. About ninety-five per cent of all Norwegian farm land is individually owned. A farm is sold only when there is no heir or when the owner has completely failed as a farmer. There is a vast difference between farming as a business for a profit and farming for a home. Norwegian farms are of the latter type. Therefore, few farmers are failures. By frugal living and good management they are usually able to pay their taxes, which are far from light, and avoid disastrous farm debts. Most Norwegian farmers seem to be satisfied with plenty, and a comfortable home. What need has anyone for more?

Old Farm Culture

Many farm houses of hundreds of years ago still stand, and some have been taken over by the State to preserve this old Norwegian culture. These early homes were constructed of the materials available in that virgin area. The foundations are of Norway's abundance of rock, uncut; the houses are of hand-hewn lumber from the virgin forests, and the years have given them a brownish color, verging on golden, which only the elements could paint. These houses are usually furnished with hand-made furniture in the style of that day. The large spacious rooms have a square open fireplace, long wooden tables with long benches on either side, hand carved cupboards, wooden beds which most certainly look too short. These old homes speak of comfort and cleanliness, but elegance is entirely lacking.

Other old farm houses have become a city fad in Norway, and many have been purchased and moved into cities and towns where they have been modernized and where they permeate an air of old Norway in a new setting. Thus the old farm culture of Norway is preserved in the lives of the people of today as well as in museums —notably in the museum at Oslo and in the Maihaugen museum at Lillehammer—where farm culture representative of old Norway is preserved for posterity and the world.

Norwegian Farm Life

Practically every farm, no matter what size, is kept in the neatest condition. No debris lies around the buildings; nothing seems to be done in a haphazard fashion; the yards seem fine-tooth combed. Practically all the buildings are painted—a splash of color in the green.

During the long summer of day light, which about the northern two-thirds of Norway experiences, farmers are seen out any hour of the night. It is not uncommon to see one coast farmer in his small boat going to visit a neighbor to have coffee at three-thirty in the morning. Even tho the farms might be adjoining, the land between might be so rocky and difficult to travel that the boat is the easier way. They seem to sleep when sleep overtakes them. During the rest of the time, they absorb sunshine while they can.

But do not gather from the foregoing that they sleep during their months of winter night. They necessarily stay indoors more, but they are seldom idle. Practically every home has a loom, and the

women weave not only for home use, but for sale; many farms have contracts with stores to furnish a specified amount of woven material. Weaving consists of tablecloths, luncheon sets, towels, pillow tops, scarfs, and many other types of woven articles. In most instances they prepare their own flax or wool or cotton and also

FIG. 6. Haying time. Abundant rainfall necessitates this method of curing hay. Wires are strung on temporary stays in the field or on the mountain side where hay is being harvested. Most haying is done with the hand scythe; and in this work, robust girls seem to have a happy time.

prepare their own delicate vegetable dyes. Also much hand sewing and embroidery is done. This is true of farms on the East Side as well as the West Side.

Fishing furnishes year-round employment and a cash income to many coast farmers. Even where it is not part time employment, fishing furnishes the meat supply for the family table. The housewife needs only request meat for the noon-day meal, and husband or son rows away in his boat. He soon returns with a goodly catch.

The men keep their fishing apparatus in repair, keep their farm tools in order, and care for the livestock during the long, snow-covered winter. They also do an endless variety of wood carving. In the southern and eastern part of the country, forestry furnishes the year-round employment and a cash income in connection with farming. Twig brooms which are used on many of the city streets, are also made by the farm men. They have the necessary materials from the forests and find it profitable to make these brooms with their extra time. These brooms are sold for about eight cents each in American money. There seems to be no rush of work on Norwegian farms, and generally speaking, there is no idleness, but rather a busy life of comparative ease and seeming contentment.

In practically every home the coffee pot is on for visitors, and it seems they make the best coffee imaginable—tho the "radio" brand is probably unknown. And most surely their cows give the thickest cream, or perhaps the seperator is not set to make much cream from little. Too, some member of the family is sure to make most delicious pastries and the table might be spread with a beautiful piece of embroidery done by the mother or a daughter.

To be sure there will always be those who underrate Norwegian farm life, who compare it only with expansive fields, and large automobiles, and that acquired standard of living instead of a natural adjustment to environment. Tho few farms could be classed as luxurious, it seems to be a most evident fact that a Norwegian farm is a place of comfort, health, recreation; where one has time to think and live and commune with nature and "love thy neighbor."

AN EXPERIMENT IN FIFTH GRADE FIELD WORK

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Cleveland, Ohio

THE IMPORTANCE OF FIELD WORK

Since the basic source of information and the laboratory material for the geographer is the landscape, it is of utmost importance that the pupils have direct contact with the actual landscape about them. Too often children feel that the landscapes pictured in the book belong to some area quite foreign to themselves even tho the same things may be found in their own immediate environment. Well-directed field-trips, not only make the children conscious of the actual landscape, but they help the children to interpret real landscapes and pictures and to visualize reading material.

Some of the major activities of man which are often dealt with in the fifth grade geography work are urban activities. Therefore, an intensive study of work done in a large city will help greatly in clarifying many concepts and ideas in the geography of this grade. The major understanding concerning cities thus gained thru field trips may be woven together into a simple city study which will function in the study of cities thruout the geography work.

In the author's experience there has never been anything which has made the children so intensely interested in geography, both the geography of the classroom and the geography about them, as the field trip work.

THE TIME ALLOTTED TO FIELD WORK

The amount of time which may be spent on field trips is very limited. Therefore, the careful planning of the trips is vital. Unless the field trips are so planned that they contribute to the major understanding for the grade level they are not worth the time spent on them.

AN EXPERIMENT IN FIELD WORK

The following article is based on a program of field work which had been planned for a year's work in fifth grade geography.[1] A similar program with appropriate variations to suit a different locality could be worked out in many other communities.

[1] This work was carried out with various fifth grade classes in several school districts in Cleveland, Ohio.

Selecting the Trips. Five trips were planned to accompany the fifth grade work from September to June. The trips were selected on the basis of what they would contribute towards clarifying concepts and solving problems in the fifth grade geography work as outlined by the Cleveland Course of Study.

The trips taken were as follows: A trip to the Cleveland Terminal Tower,[2] from which the children could gain a bird's eye view of the general layout of the city, the manufacturing area, the commercial area, part of the recreational area, and a part of the residential area. A trip to the Cuyahoga River Valley manufactural and commercial area. A trip to the Pennsylvania Ore Docks along the lake. A trip to the railroad yards. A trip to the food terminal.

In planning the field trips, a teacher should also make use of the landscape along the way as the pupils ride from the school area to the district of the field trip. The particular railroad yards and the harbors in this set of field trips were chosen chiefly for the fact that they best illustrated the desired material, and also, in part, because a study of the intervening landscape was desirable.

Planning the Trips. In planning for the trips, the teacher should go over the route of the field trip very carefully before taking her pupils there. She should know just what she wishes the children to see, what the purpose of the trip is, what the outcomes will be, and how it will function in the unit as a whole. Before taking the trip the children should be made aware of the things they are to look for at the place of the actual trip and the things they are to note in the landscape as they are riding to the place of their destination. Care should be taken that the children have sufficient background for understanding the things to be observed. The author has found that the children become keenly interested in the whole trip if they get a series of simple maps which they are to fill in as they proceed on the field trip. For instance, the children in Cleveland were given two maps, one of the route from the school to the place of destination along which the street car went and the other of the area covering the actual trip. The maps were explained to the children in the classroom before the day of the trip.

In preparing for the trips the children should be given careful instructions in regard to their conduct so that the whole procedure may go smoothly.

[2] The Cleveland Terminal Tower stands on the public square. Its height together with the observation room on the top floor make it a very desirable place for a general view of the city.

Conducting the Trips. *Trip 1. To the Terminal Tower.* On the day of the trip the children started off by locating on their maps in the proper place the name of the school building from which they started. The short distance from the building to the street car was noted and checked on the map. This helped to clarify the 'scale of miles' idea for a few children who failed to visualize it earlier in the year. The children thrilled when they found on their maps the actual turns the street car made. On the way the children could mark on their maps the approximate location of the purely residential area, the area of small commercial establishments and residences, and the warehouse area. The children noted the use the railroad made of the low valleys leading into the city, and the adjustment man made bridging those valleys. Many minor details were also noted.

When the children reached the Terminal Tower they were given other maps. These maps were of the area which they could see from the tower. At first the children were allowed to view the landscape as they wished. They discussed what they saw with each other while the teacher went about and pointed out things of importance in the landscape to small groups of children at a time. The children asked many good questions. The group was then called together and the class discussed what activities they had seen from the tower, along the river, on the square, and further out. They then found all the things in the landscape which helped to explain the activities which they saw. Of course, the landscape and their previous knowledge could not answer all the questions, hence the questions were recorded so that they might be studied more fully in the classroom.

The children sketched in on their maps the approximate location of the factories, docks, warehouses, and the harbor. The children then hastily marked in the downtown commercial area, as much of the railway system as they could see, the main streets, the residential area, and the recreational area. From their own crude maps they could note the focusing of highways, railways, and water transportation on the center of town. They could also give reasons which helped to explain the type of city pattern which they saw.[3] However, most of the detailed discussion was left for the classroom. The lesson in the terminal ended with a summary of the things the children had noted and a check-up of what they saw on the trip down.

[3] By city pattern is meant the general layout of the city, the commercial area along the lake, the manufactural area along the river, the direction of the streets in relation to the lake shore, the converging of land routes at either side of the valley, and the radial pattern of the streets.

The children had an opportunity to re-check their maps going back and to add anything they had not noticed on the way down.

The Follow-Up Work. The work in the geography class the next day followed up the previous day's work. The children were given new maps of their trip so that they could rework the maps and make corrections with the help of the maps the teacher had carefully worked out for them. Reading, map, and picture material was provided to help the children find other explanations for the activities which they saw the day before. The next day the geography period was used for a summary discussion of the activities which the children had seen. The actual work involved in each activity and the reasons for these activities formed the major part of the discussion. This discussion period, of course, was not the end of the field trip, for the ideas gained helped to illustrate many critical points thruout the remainder of the years' work. The outcomes of this trip were used as part of the introduction to the work on the North Central States.

The general method of preparing for, conducting, and checking the remainder of the field trips was practically the same as that for the first.

Trip 2. The Cuyahoga River Valley. The second field trip was taken to the industrial Cuyahoga River Valley. In this valley is found the chief manufactural district of Cleveland. Again, the children had a map showing the trip to the valley. This map was drawn on the same scale as the map for the previous trip so that comparisons would be simple.

The children entered the valley near enough to the lake to see from the cliff, the mouth of the river, the railroad yards along the shore, and the location of factories along the lake front. As they walked thru the valley they noted the various types of activities carried on as indicated by the work they saw people doing, the machinery about, and the types of buildings. Thus, they noted factory buildings and warehouses, boat repair buildings and offices. They saw lake freighters unloading rock. At the coal dock they saw coal transferred from the railroad cars to lake freighters. The children noted the repair docks, the lighters, the tugs, and the dredges. The different types of movable and stationary bridges used were pointed out. The children observed that in each case the bridge was used which best served land transportation and hindered river traffic the least. The children came to the conclusion that man made re-

markable adjustments here and that much skill was necessary in developing the area.

The children again had maps of the area along the river. They mapped the location of the main factories, the warehouses, the railroad yards, and the docks.

The Follow-Up Work. The trip was followed up in the classroom by using a series of pictures showing the manufactural, transportational, and storage activities along, first the Cuyahoga River and Erie lake fronts, then along other rivers and lake fronts elsewhere. Thus, the children could draw conclusions about kinds of work done in many cities along rivers and lakes. This formed the basis for generalizations and major principles applicable to a large number of river and lake cities. This trip clarified the meaning of many terms often used in the classroom, as for instance, warehouse, dredging, tugs, hoisting machinery, and lighters.

The children now put the maps of the two trips together. They had two strips of mapped territory from their school to the downtown area. The downtown area and the Cuyahoga Valley were also mapped in part.

Trip 3. The Pennsylvania Ore Docks. The third field trip was to the ore docks. Again the children were prepared as before with two maps. This time the second map turned out to be more exactly a detailed layout of an ore dock and the surrounding territory.

On this trip, the children had to go thru the center of town, the object of their first field trip, over the Cuyahoga valley, the object of their second trip, and then thru a commercial-residential section, into a residential section, and finally into the commercial area along the lake front. This clarified in their minds the general pattern of the city and the concentric arrangement of activities about the heart of the city.

Arrangements had been made with the company officials to have the children study the ore docks at the time when an ore boat was being unloaded. On the way to the docks the children could see the freighter maneuvering in the lake to get in position for unloading. By the time the children arrived the boat was in position, had been fastened, and was ready for unloading. The children watched the cranes lift out the ore and dump it into railroad cars which piled the ore some distance from the lake. Later, the group walked about the ore docks with several company guides. They were shown the general layout of the docks, and the various piles of ore where they

noted the different varieties by their colors. The children sketched in on their maps the docks, the cranes, the railroad tracks, the piles of ore and the general office buildings.

The Follow-Up Work. The following days the material of the maps was added to the large map. The clear image which the children acquired of the docks, the method of loading and unloading and the rapid and orderly handling of bulky commodities helped them later in visualizing such activities in any other lake city.

Trip 4. The Railroad Yards. The fourth field trip was taken to the railroad yards. This time the trip took the children to the outskirts of the city rather than towards town. The children had but one map this time, namely, the map showing the route to the railroad yards. The children went from an average residential district to a poor one and finally to a manufactural area again which was of the type that needed much room and could find the needed space on the outskirts of the city.

The children noted automobile factories, brick yards, and iron and steel factories which manufactured small articles. The children were able to give many good reasons for such manufactures in this part of Cleveland.

At the railroad yards the children noted the miles and miles of track for storing cars, the various types of railroad cars, such as freight cars, passenger cars, refrigerator cars, cattle cars, coal cars, ore cars, flat cars for carrying wood and steel, cars for boxed freight, pullman cars, coaches, chair cars, mail cars, and cabooses. The children saw the round house, places for repair jobs, and the freight station. In the office, they got some idea of train signaling, and making up of trains, the getting of out loads, and the getting of return loads.

The Follw-Up Work. In the classroom the children added to their map the route to the railroad yards. The concepts gained this time functioned in many ways when discussing railroad centers and activities associated with these, when discussing the railroad network and the movement of commodities from place to place.

Trip 5. The Food Terminal. The fifth field trip was one to the food terminal. This time the trip led towards a place several miles from the center of town. Again, they had but one map of the route to the food terminal. The children noted the old nature of this part of the city and signs of former prosperity.

At the food terminal, the children noted the large number of

railroad tracks, the wide street space for parking the trucks which were to take the food to the city markets, and the stalls for auctioning the carloads of fruit and vegetables. The children observed the location of the food terminal with reference to the large area of level land needed for such activity, the nearness to the main railroad lines and the accessibility to the city as a whole which was to use the food received here.

The Follow-Up Work. The follow-up work included the filling in of another part of the map. Then from pictures and maps provided by the teacher the map of Cleveland was completed. By this time pictures were quite as realistic as was the landscape. Much of the remainder of Cleveland was visited thru pictures.

SUMMARY

This whole series of field trips gave the children a fine concept of a city and its function as a whole. It also helped the children in their mental imagery of various types of work. It seemed as tho the field trip work functioned in understanding something better nearly every day the remainder of the year.

Thru this series of field trips the children gained ideas concerning distance and direction, city functions and city patterns. They learned how navigation activities, the manufacture of iron and steel, the movement of foods, and the care of the river are adjusted to the seasons. The children learned the relation of one city activity to another and their dependence on one another. They came to understand that the crowded residential areas were essential in providing workers for the manufactural and commercial areas. The class also came to realize that many of the city activities are dependent on other activities elsewhere.

THE MATANUSKA VALLEY OF SOUTHERN ALASKA

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Public interest in the Matanuska Valley has been stimulated by the efforts of the United States government to establish a colony of American farmers in the region (1935). Some 200 families, pioneers in a limited sense, have moved into the region. What is the nature of this valley? Is it suitable to profitable agriculture? Is the climate too severe for the average American? This article is a brief survey of the region. Time and the experiences of the "colonists" will help answer the question of the habitability of this relatively small area.

Location

The Matanuska Valley is located in south-central Alaska, lying just northeast of Cook Inlet, an arm of the Pacific, and about 100 miles north of Seward, the nearest ocean seaport (Fig. 1). A government-built railroad extends from Seward to the lower end of the Matanuska Valley and thence northward east of Mt. McKinley to Fairbanks, the principal settlement in central Alaska. A branch of the railroad extends up the Matanuska Valley to Chickaloon.

Natural Elements of the Landscape

Climate. The Matanuska Valley lies so far inland from the Pacific Ocean that its climate cannot be classed as marine. On the other hand, protecting mountains and ocean influence produce a climate with winters by no means as severe as those at Port Nelson on Hudson Bay and much farther south. Matanuska's climate might be classed as continental interior with marine influence.

Summer temperatures are mild. June, July and August have average temperatures between 55°F. and 60°F. with maximums around 65°F. and minimums between 40°F. and 45°F.[1] Winters are severe. December and January have average temperatures between 5°F. and 10°F. By way of comparison, the January average at Port Nelson is —17°, at Winnipeg —3° and at Bismarck, N.D., 7°. The frost-free period in the valley is about 115 days, from May 20 to September 15.[2] This short growing season is offset by the long summer days.

[1] U. S. Weather Bureau. Climatic data for this region is very limited in amount.
[2] Special Publication No. 14, Amer. Geog. Soc., 1932.

Precipitation is light and shows considerable variation from year to year. Total annual precipitation ranges from 10 to 17 inches.

FIG. 1. Location of Matanuska Valley

There is a distinct summer maximum. Between two and three inches of rain usually fall in July and August. This limited quantity, aided

MATANUSKA CLIMATIC DATA

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
Mean temp. F..	7	18	20	34	45	54	57	54	46	33	17	9	33
Mean rainful inches.....	.57	.61	.48	.68	.67	1.10	2.16	2.60	1.75	1.62	.50	1.17	14

Annual range of temperature is 50°.

by extremely long days, is sufficient to cause very rapid growth of crops. Snowfall is not excessive. However, continuous temperatures below 32°F. cause the snow to accumulate during the winter to depths ranging from two to four feet.

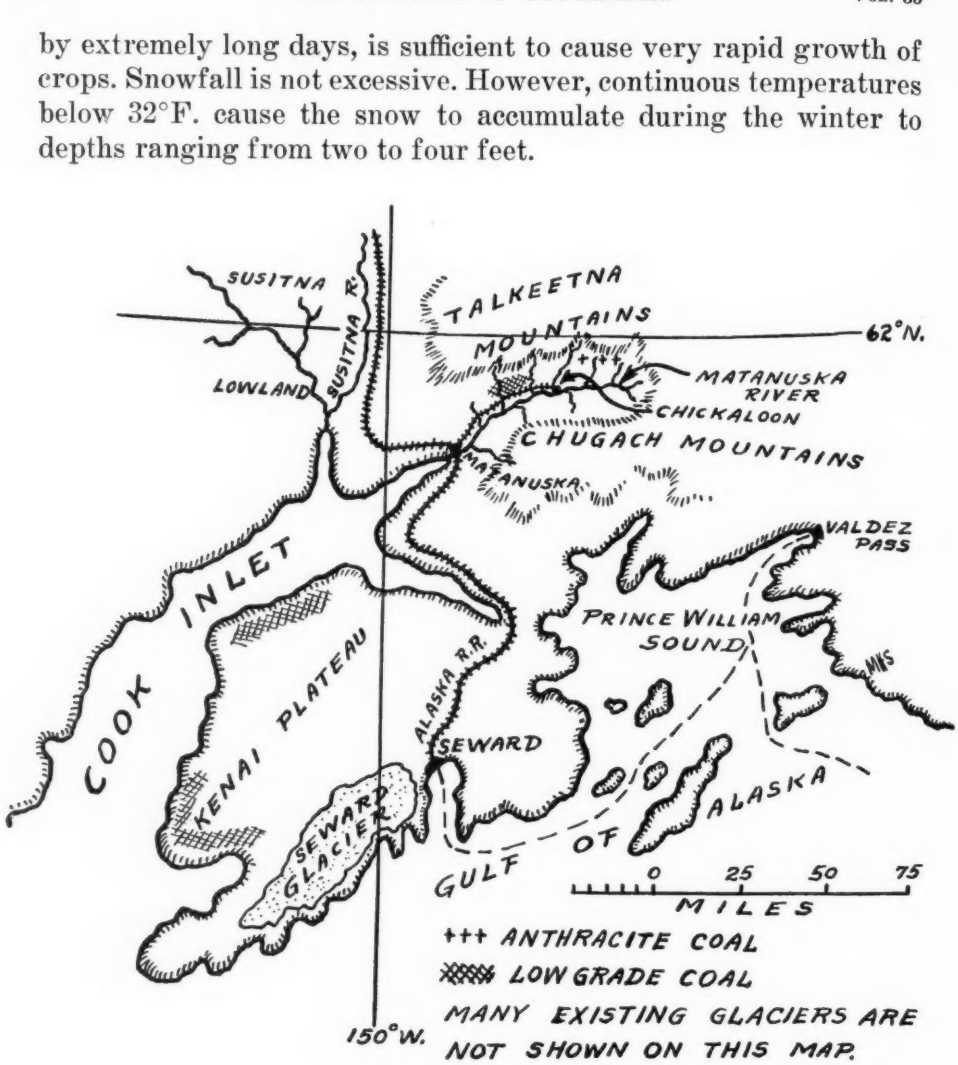

FIG. 2. Map of south-central Alaska showing location of the Matanuska Valley. From Bulletins 500 and 791 of the U. S. Geological Survey

The Land Surface. The Matanuska River is about 80 miles in length, flows toward the west into Cook Inlet, and lies between the Talkeetna Mountains on the north and the Chugach Mountains on the south (Fig. 2). It has a drainage basin of about 1000 square miles. The river is overloaded with sediment and often flows thru several small channels over an aggrading flood plain, similar, tho much smaller, to the Platte River in Nebraska. It is, therefore, not navigable. The fall of the river is so evenly distributed thruout its

course that there is little available waterpower. The principal tributaries enter from the north. The mountains surrounding the valley rise to elevations ranging from 5000 to 8000 feet. The Matanuska Valley proper has a general width of about six miles between fairly distinct mountain fronts. In the valley are rounded hills rising to elevations of 2300 to 3500 feet. There are gravel-covered flats about 1200 feet above sea level while others, at the mouths of tributaries, reach 2200 feet. Tributaries occupy narrow valleys in the broader valley. The Matanuska River itself lies noticeably toward the

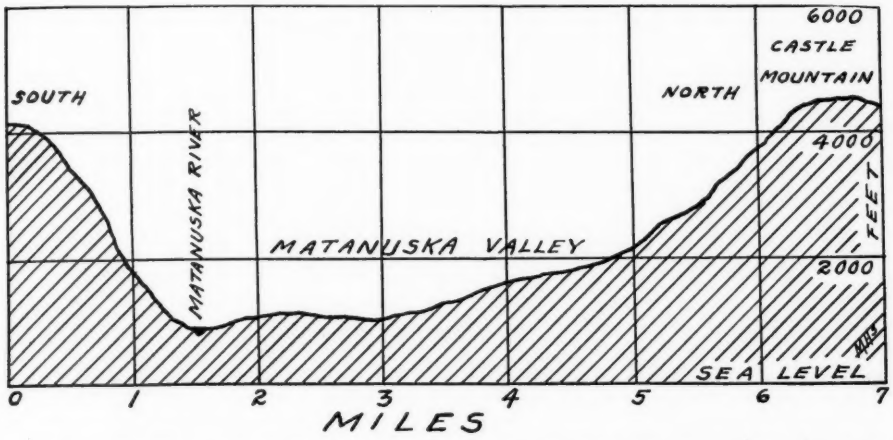

FIG. 3. Profile across the Matanuska Valley, located in South Central Alaska, from topographic map, U. S. Geological Survey. Profile extends from north to south along the meridian of 148°30′W., just west of the point where the Chickaloon River enters the Matanuska River. Vertical exaggeration about 2.5

south wall of its valley. Near the mouth of the river are the Cook Inlet flats, a gravel-covered lowland containing much marsh land.

While the valley has a general width of some six miles, the area of fairly level land suitable for agriculture is rather limited. The age of the valley is young to mature geologically in spite of the fact that the Matanuska is an aggrading river. In the upper valley the river flows between rock walls that rise 1000 to 4000 feet above the valley floor which is less than one mile wide (Fig. 3). The elevation of the Matanuska River itself ranges from 350 feet near the mouth to about 1250 feet in the upper valley. A dozen or more lakes occupy glacial depressions within the valley. These lakes range from one-half to one mile in length.

Bed rock in this region is of considerable variety, including rocks of igneous, sedimentary and metamorphic origin. Along the

river is an area of steeply folded and faulted sedimentary rocks, mainly sandstone and shale. To the north are the granitic rocks of the Talkeetna Mountains and to the south the metamorphic slaty and schistose rocks of the Chugach Mountains.[3] The lateral boundaries of the lower valley are sharply defined. The northern boundary against the Talkeetna Mountains is a fault zone. Many of the faults in the lower valley parallel the course of the river. The eastern Talkeetna Mountains are quite different from the western, consisting of tilted masses of sedimentary rocks overlain by nearly horizontal layers of lava.[4] It is in the complexly folded regions of the upper valley that the better grades of coal are found. Geologically, this is a most interesting region.

Soils are a result of glacial and stream deposition. A high percentage of the valley is covered with glacial drift in the form of rolling hills. Mountain streams have deposited sand, gravel and clay at the points where they enter the main Matanuska Valley. The glacial drift over much of the region forms a fairly rich soil. Trees and native vegetation have covered the valley for many years, adding humus to the soil. Tree growth, however, has been interrupted by a number of severe forest fires. The rolling topography makes for good drainage thruout most of the valley, altho a number of lakes and swamps exist. From a study of the topographic map it is easy to see that drainage of swamp lands would not be a serious problem. As might be expected, the morainic material in places is too rough and rocky to be cultivated.

Natural Resources. It seems strange, in this region where numerous intrusive dikes and sills of igneous rocks are to be found cutting thru layers of sedimentary rocks, that contact-metamorphism did not produce any noticeable metallic deposits. Yet this seems to be the case. Prospecting and coal mining operations have failed to discover any gold, silver or copper veins of any importance. The absence especially of gold has been responsible somewhat for the fact that the Matanuska Valley has not been colonized to any extent in years gone by.

The principal mineral resource of the region is coal. It grades

[3] G. C. Martin and F. J. Katz. Bulletin 500, U. S. Geological Survey, 1912. Geology and Coal Fields of the Lower Matanuska Valley.

[4] S. R. Capps. Bulletin 791, U. S. Geological Survey, 1927. Geology of the Upper Matanuska Valley, Alaska.

from lignite in the Susitna lowlands to low-bituminous in the lower Matanuska Valley and finally to the best deposits in the upper valley near Chickaloon where high grade anthracite is mined. Coal deposits have given the name "Anthracite Ridge" to a range of mountains on the north side of the upper valley. "The high grade anthracite of the Matanuska Valley is the only coal on the Pacific Coast suitable for the U. S. Navy. In addition there are good coking, bunker and blacksmith coals."[5] The greatest difficulty in the coal mining industry is that the occurrence of the beds makes mining operations expensive. Again, there is the truck haul from Anthracite Ridge to the railroad at Chickaloon, a distance of some 10 miles.

Native Plant and Animal Life. A dense growth of native grasses, especially redtop and bunch grass, covers the more open places where fires have destroyed the forests. This grass furnishes feed for livestock. Trees are small, due to forest fires. Most of the tree trunks are less than a foot in diameter. Spruce, birch and cottonwood predominate. There is no timber for export. In the adjacent mountains, the timber line ranges from 2000 to 2500 feet above sea level, indicating the severity of the winter climate. In the Rockies of Colorado, timber line is around 11,000 feet.

Animal life of the region is of considerable variety. Game animals include sheep, goats, black and brown bear, moose and caribou. Sheep are most abundant. Smaller mammals include squirrels and rabbits. Fur-bearing animals have been largely killed off. Here then is a region where fur-farming can be established. Game birds include ptarmigan, grouse, and ducks. Lakes and streams contain trout, while some salmon are caught in the Matanuska River.

Cultural Elements of the Landscape

Population of the Matanuska Valley is sparse and includes Indians, a few native whites of Alaska and the late colonists from the United States. The two principal settlements, both on the Alaska Railroad, are Matanuska in the lower valley and Chickaloon, situated somewhat near the center of the valley. It is difficult to say just what the population of the valley is at the present time. The Indians move thru the valley from the Kenai Plateau region to the

[5] L. A. Wolfanger. Economic Regions of Alaska. *Economic Geography*. Vol. 2, (1926), p. 508.

interior of Alaska. The white population is by no means permanent. Recent newspaper articles state that several of the 200 families that went to the valley from the United States have returned. Bungalows of the log cabin type have been built. Many homes are equipped with radios. Each family has been provided by the U. S. Government with a bungalow, machinery, some cattle and a certain amount of money.

The United States Department of Agriculture established an experiment station in the Matanuska Valley in 1917. "It has been demonstrated at the Matanuska Experiment Station that grain growing and general farming can be made a great success."[6] As previously stated, the frost-free period is about 115 days, from May 20 to September 15. Long days in summer make for extremely rapid growth of crops. The cool weather checks excessive evaporation of moisture from the soil.

Cereals have been produced successfully in the valley, spring wheat averaging 22 bushels an acre, oats 51 and barley 24. The yield of oats is especially interesting since both the grain and straw are valuable in the feeding of horses. Potatoes are the important crop, yielding 200 to 300 bushels an acre. No field corn is produced. Less important crops are field peas, flax and the root crops. Forage and hay crops include alfalfa, field peas, alsike clover, white clover, smooth brome grass, slender wheat grass, and native grasses. Fall plowing is almost an absolute necessity in order that crops may get an early start in spring. Wheat has been improved by importation of hardy, early maturing varieties from Siberia.

Cattle seem to do well when properly protected from severe weather, because there is an abundance of forage and hay. The Galloway beef animal and Holstein dairy breed are favorites in the region. The Asiatic Yak from the bitter climate of the Plateau of Tibet has been imported and is being crossed with domestic breeds. The Alaskan farmer is primarily a stockman.[7] Some, however, turn to fur farming in the winter, an industry that holds great promise in this particular region.

The only mineral resource of any importance is coal. Lignite, bituminous and anthracite are present in the region. For several years the coal mined had an annual average value of about $500,000. With the influx of the American colonists, coal mining will be

[6] C. C. Georgeson. Special Pub. No. 14, American Geog. Society.

[7] L. A. Wolfanger. Economic Regions of Alaska. *Economic Geography,* Vol. 2, 1926.

stimulated, and if mining operations do not prove too expensive due to the nature of the occurrence of the coal beds, the export of coal may become of increasing importance.

SUMMARY

The Matanuska Valley is an east-west valley in southern Alaska, surrounded by high mountains. The climate is characterized by mild summers and severe winters, with a summer maximum in rainfall distribution. The valley floor is covered with glacial drift and alluvial deposits, and is by no means level. The removal of timber, stumps and burnt-over forests is a considerable problem for the American colonists who have gone to the region. Results of the United States agricultural experiment station at Matanuska indicate that successful agriculture is a possibility. It is doubtful whether the export of farm crops, with the possible exception of potatoes, ever will be of any importance. The long haul to the markets of the United States and Canada is a considerable handicap. Other possible sources of income in the region are coal mining and fur farming. Tectonic forces, glaciation and stream erosion in the nearby mountains have made the entire region one of great scenic beauty and geologic interest.

Opinions of visitors to the Matanuska Valley as to the success or failure of the recently-established American colony vary greatly. Time will tell the story.

DEVICES TO CREATE INTEREST IN GEOGRAPHY

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Never do I hear a child or a grown person say, "I do not like geography," without thinking, "What a pity!"

Geography is such a living, vital subject in these days of complex living. Textbooks, with their wealth of up-to-date information, with their pertinent pictures, with their suggestions and check-up tests, and, finally, with their maps and their charts relating to the surface, temperature, rainfall, growing seasons, economic and political aspects, furnish an excellent basis upon which to build a geography consciousness. Then newspapers, bulletins, and magazines are full of present day material to supplement that of the textbooks.

Make Children Geography Conscious

My work lies with the children of the fifth and the sixth grades. It is to make them geography conscious that I bend my energies. To lead them to this goal is the aim of my teaching. Reasons to support the merit of this aim are many. No one can appreciate history without an understanding of geography. No one can appreciate travel to the utmost without knowing something about places and peoples. No one can understand the whys and the wherefores of climate without knowing about the conditions which control climate.

The curricula for our fifth and sixth grades encompass all of the continents. They are based on the one-cycle plan. The geography periods are of half-hour length daily. Because of the scope of the curricula we cannot choose some phase and make it a semester or even a quarter's project. We have to travel. Sometimes we travel as rapidly as a high-speed automobile. Of course we are not always satisfied with the information and the content which we gather. Five weeks in the British Isles, another five in its possessions, two, perhaps, in France and its possessions, and so on thru the list are only long enough to build a small foundation and to create a desire to know more about the world in which we live.

O well! a dunce should be able to coast down hill on an iced-slide. Countries, peoples, and even physical conditions have been changed by thought and ingenuity. So it is my business to bring thought and ingenuity to my geography situation. The fundamental

facts can be taken care of within the alloted time, but if a desire for further reading and study is to be inculcated it must be done thru interesting devices.

SOME DEVICES USED

Varied Map Work. Several of the devices which my classes and I have used are: many different types of maps—physical, political, economic, rainfall, population, etc. (These are done chiefly on stenciled outlines for lack of time to perfect free-hand drawings; also, because the stenciled copies are likely to be more true to form.); reports—these give an enlarged opportunity of learning that can be carried on from reference books and from libraries; displays or exhibitions; current newspaper and magazine articles; the reproducing of pictures which can be correlated with the art work, slides and stereographs, class and individual note and scrap books; and dramatizations.

We are fortunate in having several bulletin boards upon which we can display maps and pictures. The colored surface maps make an artistic decoration for the room. For a pupil to have his or her map on display fosters pride in reproducing or creating. The pleasure this gives is not a negligible quality. For example, a boy who had not done particularly good work in the fifth grade but who is beginning to find his possibilities in the sixth found his map on display. He smiled happily and seemed loath to take his eyes from it. At recess time he came back to gaze at it as fondly as an old cat might at a smart kitten. All, no matter what their status in their school accomplishments, feel a pardonable pride in any composition worthy of display.

We have carried the map idea over into a class project many times. One semester we outlined the world twice on a length of blackboard, once for the boys, and once for the girls. We procured large figures used in advertising merchandise and fastened a woman's figure in the center of one world map and a man's figure in the center of the other. The title of our project was: Where the Clothes Come From which a Well-dressed Man or a Woman Wears.

We took the garments with which these figures were clothed as a basis, drew lines to indicate the parts of the world from which the raw materials or the manufactured products might have come. Our books of information were then brought into use. Reports were written setting forth the facts and stories concerning the garments. Wool from the West for coats, silk from China and Japan for the

dress, cotton from the South for the shirt, leather from the West for the shoes, kid leather from France for the gloves, Panama hat from Ecuador, lady's hat from Paris, diamonds from South Africa for the settings of the rings, platinum from Columbia or the Ural Mountains for the bands of the rings, and perfume from the Valley of Roses in Bulgaria were a few examples of our research. Each pupil took some one particular article of dress and traced it to its original source. When our project was completed we invited the parents to come to hear about the things we had discovered and to see the results of our work.

Another map project which I felt was especially enlightening to my pupils was a simple one about "Time." We took this subject from the point of view of why, for instance, it is 1:00 P.M. in London and perhaps only 8:00 A.M. here.

Our procedure consisted of drawing meridians on the blackboard at equal distances apart. These distances corresponded with the meridians of pattern continents (continents which we had been allowed to cut from an out-of-date world map). Next, we pasted these pattern continents in proper position on the meridians. The meridians were numbered 0°, 15°, 30°, etc., seeing that 15° of longitude equals one hour of time. Blue chalk was used to color the Prime Meridian and red chalk the International Date Line. Clock dials for the twenty-four hours of the day were made by the children of the sixth grades. Then we arranged and pasted them on the meridians. We placed 12:00 noon on the Prime Meridian and 12:00 midnight on the Date Line. Eleven A.M. was placed on the 15° West Longitude and 1:00 P.M. on 15° East Longitude, and so on for all of the hours of the day. Reports were looked up for the Greenwich Observatory and the Prime Meridian, also for the International Date Line. The children discovered that there is a great Time Ball at the Greenwich Observatory from which Time is regulated. When this project was completed we had lessons and discussions based upon it in each fifth and sixth grade class.

One semester my two Six A geography classes worked out a stimulating review of Europe. Each pupil drew the name of a country or of a large city then proceeded to find material relating to the city or the country. This material was worked over into first person stories. Large free-hand maps were drawn on cardboard to accompany the stories. The maps were colored to show the chief surface regions, if a country, and if a city, special buildings or

streets were well-marked. In most cases the maps were adorned with a drawing of a person wearing the national head dress. Some of the pupils turned the map itself into a figure or an animal.

These stories were presented to the class and visiting parents by impersonation. The maps were displayed by fastening them with gummed paper to the blackboard. The following are bits of the stories.

1. "I am Turkey. I live in southeastern Europe. European Turkey is but a small part of the territory which the Turks once controlled in Europe, etc.

Istanbul (Constantinople), on the Bosporus, is by far the largest city of the Balkan Peninsula and is one of the most ancient and celebrated cities of Europe. Here the Greeks founded a city seven hundred years before Christ and called it Byzantium, etc.

The sheep wool and mohair produced in this region have led many people to engage in the weaving of woolen cloth and in the making of carpets and rugs. This work is carried on in the homes and in small workshops in many of the towns, and villages. Large quantities of Anatolian rugs are exported to our country, etc."

2. "My name is Czechoslovakia. I am made up of the Czechs and of the Slovaks. My capital is Praha (Prague). We make the celebrated Bohemian glass. We have kaolin of which to make porcelain, etc."

3. "My name is Irish Free State. I am shaped like a bear. Northern Ireland is a pack of wool on my back. The Atlantic Ocean is to the west of me and on the east are the Irish Sea and St. George's Channel. My neighbors are Scotland and England, etc."

Free Hand Picture Project. At the time of writing my home room sixth grade has completed a picture project. Several years ago an art instructor taught us how to make and enlarge geography pictures for decorative borders. We decided to use this idea for a visual education lesson. First, we chose pictures that would be of travel interest, but confined ourselves to Europe. We made small plans on nine by twelve inch art paper, then we enlarged the designs on two by three feet newsprint. Chalks and colored crayons were used to make the pictures colorful. Each child prepared a story or a lecture about his own point of interest, sometimes bringing in other parts of the world which had similar points of interest. The first scene shown as we arranged our route was an ocean liner. This was followed by icebergs, a cross-section of the liner, the peat bogs and Blarney Castle in Ireland, the Clyde shipyards, the fishing fleets in the North Sea, the farms in Southern England, the polder lands and the flower fields of Netherlands, the coöperative dairies of Denmark, the fiords of Norway, the "Land of the Midnight Sun," the taiga of Russia, the *Graf Zeppelin* in Germany, an olive orchard, the memorial arch on the Appian Way in Italy, mountain scenes and a Swiss home, the French Alps, a canal and a castle in

France, also, the turpentine forests, a valley in the Pyrenees, taking cork to market, and the Rock of Gibraltar.

We fastened the newsprint drawings to large cardboard sheets with paper clips, one drawing on each side. They were numbered to facilitate the handling of them. On our exhibition day we arranged tall screens on either side of a table. Two boys manipulated the pictures while the owner of each located the point of interest on a large wall map of Europe and gave his or her lecture. Several parents came at our invitation and seemed very much interested in the device we had used to enliven the geography content.

Original Dramatizations. Another semester we wrote a play. It was a Good Will creation. We made puppets for actors. One boy made a stage and contrived the strings with which the puppets were controlled.

Briefly, the subject matter of our play was the dream two children had after spending an evening reading travel pamphlets. Two book characters, Heidi and Pinnochio, came down from the volumes on the shelves and informed the two children that the children of the world were going to pay them a visit. They came and passed in review and contributed their parts to the thought of the play.

Several times have my pupils and I worked out some project or play with the thought of promoting Good Will among the children of the nations. Once it was a drama, entitled, "Miss America Entertains." This play was quite elaborate. Children from nearly every grade in the school had a part in it. Miss America was dressed as Columbia. Folk Dances, National Songs, instrumental numbers, verses, and stories were the medium for carrying out something native to each country represented. The drama was followed by a flag drill. We procured some flags from a supply house and borrowed others. We gave this drama at an evening meeting of our Parent-Teacher Association.

Another play which we wrote and produced in commemoration of Good Will Day was entitled, "The Children's Way." The first scene opens with a boy and girl of Austria lamenting their poverty. A good fairy overhears and acquaints the children of the world of their plight. The Children flock to Austria taking the starving ones food and clothing for their material needs and proffering their friendship.

In our plays and projects no great expense has been gone to in

any case. We have kept costumes and any adjuncts necessary very simple. From time to time materials and costumes have been acquired and kept by the school for future needs.

Every semester some new idea presents itself. It is thru the working out of these ideas that my pupils learn to be geography conscious. This is evidenced by the news and magazine articles, the pictures and the specimens which they bring to class to broaden our knowledge of this most interesting subject.

MEXICO: THE IRON AND STEEL INDUSTRY

BEN F. LEMERT AND ROSE V. LEMERT
Duke University

LOCATION

The iron and steel industry of Mexico is located at Monterrey in the northeastern part of the republic. This city, having a population of 137,388, is situated at an elevation of 1624 feet above sea level. The elevation of the city results in a milder climate than that of Tampico or Matamoros, a condition advantageous to the manufacture of iron and steel in as much as this industry requires the use of furnaces in many processes.

The location of the iron and steel industry at Monterrey is advantageous to this industry because Monterrey, set down in a pocket between mountains, is a railroad center. To the west of the state of Nuevo Leon of which Monterrey is the principal city, lies the state of Coahuila with its coal deposits. In the vicinity of Monterrey is an abundance of limestone for fluxing material. West of Monterrey, across the state of Coahuila is the state of Durango whence come the ores used in Mexican iron and steel manufacture. Natural gas reaches Monterrey via pipe lines from the Texas fields.

From Monterrey railroads extend to Nuevo Laredo on the north; to Matamoros on the northeast; to the oil fields of Tampico on the southeast, and southward to Mexico City and the densely populated section of Mexico. Westward rail lines extend to Saltillo, Torreon and Durango, with connecting lines leading northwestward to Chihuahua and Ciudad Juarez. All these railroads, focusing at the common point, Monterrey, constitute that city a common center at which raw materials may be concentrated, and from which finished products may enjoy wide distribution.

The location at Monterrey may be termed disadvantageous due to the fact the center of population and greatest economic activity of Mexico is in the south central part of the country in the vicinity of Mexico, D.F. This means a long haul for products shipped to the largest market and anywhere one goes in Mexico he soon finds mountains that must be crossed. However, if the iron and steel industry were located half way between the coal fields and the iron ore mines of the republic, it might find itself somewhere in the state of Coahuila but would not be much nearer Mexico, D.F. If it were located close to Mexico, D.F., this industry would be far from the sources of its chief raw materials. As the finished products of the iron and steel industry are better able to stand transportation charges than the cheaper raw materials, it seems that Monterrey is not without its advantages as a center for this industry.

EQUIPMENT AND PRODUCTS

The iron and steel mills at Monterrey consist of a blast furnace, rolling mill equipment, and shops. After mentioning the furnaces and the rolling mills, the remainder of the industry may be classed somewhat as foundries and machine shops. The latter distinction may be made because the chief products of this industry in Mexico are T-bars, bridge iron, bars and rods, spikes, nuts and bolts, and wire. The processes observed at the end of the mills in the vicinity of the blast furnace resemble those seen in such establishments in the Mahoning Valley in Ohio, or in any of our large iron and steel centers. The nut and bolt, and the wire mills resemble machine-shop processes. The T-bars and the rod iron are turned out in rolling mills. The rod iron is taken to the bolt and nut departments where these articles are either pressed out cold, or in the case of large sizes, must undergo heating processes. The wire is manufactured cold. The coils of rod iron start thru reducing machines which press and stretch the iron smaller and smaller by the application of great force, producing many different gauges of iron wire. Most of this work is done by modern machines. There are a few operations where machines tended by women appeared out of date and wasteful. On the whole the industrial establishment appears modern and much like similar establishments in the United States. A spacious office building set in landscaped gardens near the plants provides quarters wherein the clerical work of the industry is performed. The products of this iron and steel industry are sold in Mexico. The vol-

ume does not satisfy the domestic market for Mexico imports a fairly large volume of a wide variety of iron and steel articles.

LABOR

The employees of the Monterrey iron and steel industry are Mexicans, mostly of Spanish origin. The Mexican Indian race is also well represented. Rates of pay between employees vary according to skill. The lamaradores, or rollers, receive the highest wages, amounting to nine or ten pesos a day (about $2.80). Trabajadores, or common day laborers, receive one and one-half to two pesos a day (about 42 to 56 cents). The working day is eight hours, while the working week is five and one-half days. The employees, according to their individual standards, can live comfortably upon their wages for ordinary living expenses for common laborers in the Monterrey iron and steel industry range from one and one-half to two pesos a day. Their common diet is soup, corn, beans, and meat. Food prices in Mexico are very reasonable and ridiculously low when compared with prices prevailing in the United States. One of the writers paid the following prices while buying food during a sojourn in Mexico: string beans, 20 centavos; fresh peas, 8 centavos a kilogram; roasting ears of corn, two ears for 5 centavos; lettuce, 10 centavos a kilogram; five large bunches of radishes for 5 centavos; 12 or 13 large carrots for 5 centavos; hand of bananas, 10 centavos; onions, 10 centavos a kilogram; beef or pork, almost any cut, 40 to 60 centavos a kilogram; excellent T-bone steaks, 60 centavos a kilogram.* While these prices are ridiculously low when viewed from our standpoint, it must be remembered the buyer was an American woman and that it is very possible a native customer would obtain the same products at a lower price, perhaps much lower. A Mexican market is a paradise for an American woman if she possesses about a dollar's worth of Mexican money and can speak Spanish.

The three thousand employees of the Monterrey steel and iron industry live in company houses which are relatively clean and neat. The employee pays a rental for one of these houses averaging six pesos a month ($1.68). In addition to this reasonable rental he buys his fuel at cost from the company and receives his water and light free. The company provides medical and hospital service, recreational facilities for their workmen and their families, and insures every worker for 1000 pesos.

* A kilogram is equal to 2.2 pounds. A peso at present rate of exchange is equal to 27.85 United States cents. One peso contains 100 centavos.

All the employees seem contented. Some own automobiles. To own an automobile in a Latin-American country indicates the owner is not a poor man. There has not been a strike in the iron and steel industry at Monterrey for more than three years. The employees have their own union which is neither a company union nor one affiliated with the Mexican Federation of Labor. The managers of the company informed the writers that agitators had recently endeavored, unsuccessfully, to foment trouble but that such influences made no impression upon their workmen as long as the workers were kept steadily employed.

As we wandered leisurely thru this Mexican steel plant, a courteous attendant from the office explaining each process and showing everything that was to be seen, we could easily imagine we were passing thru a similar mill in our own country. The floors were clean, the machines surrounded by safety devices to protect the workmen, the workers were dressed like American workmen, and the products were like American products. There was, however, not the hustle and flurry seen in American steel mills. The Mexican workers went quietly about their tasks, the machines turning out a steady stream of finished products. One did not feel the tenseness that pervades the American factory, and of course, instead of hearing English and a mixture of European languages, the few words spoken by the workers were in Spanish. Perhaps the American mills are more efficient, only office records would tell. Such a story might be surprising for this mill produces pig iron cheaper than it can be produced in our enormous, efficient plants.

GRAIN TRAFFIC ON THE ILLINOIS RIVER

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An interesting movement of grain on the Illinois River has followed the recent canalization of that stream by the United States government. The waterway improvements consist of a series of locks, dredged and marked channels, and new bridges built high enough to permit the passage of boats.

The chief benefit of the river route lies in the possibility of removing surpluses from our inland producing areas into export markets, or to distant non-producing areas in our own country. About twenty per cent of the surplus corn on farms located within thirty-five, at most, forty-five miles from a river elevator, is taking advantage of reduced rates on the government subsidized barge line. Trucks haul directly from farm to river, altho the farmers usually sell thru their local grain dealers.

The Farmers' National Grain Corporation of which State Regional Grain Dealers are members, has built elevators at South Calumet, Morris, Ottawa, Henepin, Henry, Chillicothe, Lacon, Pekin and Meridosia, thus serving a seventy mile wide strip diagonally across the state of Illinois. A few independent elevators have been built also, and a few independently owned barges operate. There is no indication that operation would fail without the subsidy. Its purpose was merely to awaken public interest.

In 1934, most of the corn was sent southward on the river, much of it being trans-shipped at New Orleans and sent thru the Panama Canal to Los Angeles, San Francisco, and Portland, where it was used for chicken feed, chiefly. Argentine corn now has captured that market completely. Drought conditions in the United States in the summer of 1934, caused a rise in the price of corn here. This was followed by an abnormally large corn crop in the Argentine. Thus Argentine corn, altho paying a tariff of twenty-five cents a bushel, reached California markets at a price twenty-five cents lower than Illinois corn sent by water. This was in July, August, and September, 1935. In January, 1936, Argentine corn still had an advantage of eight cents a bushel. Since the large domestic crop of 1935, Illinois corn may again recover the west coast market.

In the summer of 1935 most of the river borne Illinois corn

went south to St. Louis, Memphis, and New Orleans. Much grain is made into stock feeds at Memphis, and some whole grain is sent from there by rail into the southeastern states. The cheap river haul, plus the shortage of corn in the cotton states, helps to explain this movement.

Some corn, wheat, oats, and rye are shipped by river from Morris, Illinois, to Chicago and there loaded onto lake carriers.

During the winter months grain movement out of central Illinois is almost entirely by rail. Navigation on the Illinois Waterway is never officially closed; however, it usually ceases from about December 15 to March 1 of each year, due to the hazards of running ice, navigation lights not operating, and the fact that channels are not marked, buoys having been picked up when rigorous weather sets in. Ice is usually encountered in the Marseilles Canal at Marseilles, Illinois and in Peoria Lake just above Peoria, Illinois. Between Lockport and Chicago there is year-round navigation, this stretch remaining clear of ice due to chemicals, current, and the passage of vessels. Below Peoria ice conditions are encountered only in very severe weather.

EDITORIAL NOTES AND NEWS

The National Council of Geography Teachers will hold its annual meeting in Syracuse, New York, on Tuesday, December 29, and Wednesday, December 30. A program is being prepared which will include several regional studies, accounts of rather rarely visited areas by geographers who have made reconnaissance surveys within the past year, a teaching unit for the elementary grades and objective testing at college level. The committee which was appointed at St. Louis to plan a testing program for the Council will present material for discussion. The meetings will be held in the Hotel Syracuse which will also be the Council headquarters. It would be well to make reservations early in the fall since the New York State Teachers Association meets in Syracuse at the same date. Hotel rates: Single rooms with bath $2.75, $3.00, $3.25, $3.50, $3.75, $4.00, $5.00, $6.00; double rooms with bath $4.50, $5.00, $6.00, $7.00, $8.00.

ALISON E. AITCHISON, president of the National Council of Geography Teachers will spend the summer in Europe including a month or more in Russia.

OTIS W. FREEMAN, State Normal School, Cheney, Washington, has compiled a list of publications containing source material useful in teaching the geography of the state of Washington. The list, as long as the supply lasts, will be furnished gratis upon application to the Extension Division of the Cheney Normal School.

The National Conference in Visual Education and Film Exhibition will be held in Chicago, at the Francis W. Parker School, June 22-25. The largest selection of industrial and educational films exhibited at any one place will be shown at this conference.

"Trends in High School Instruction and New Curriculum Material in the Secondary Field" and "Geographic Education Moving Forward" are the themes to be discussed at the geography sessions sponsored by the National Council of Geography Teachers in cooperation with the National Education meetings at Portland, Oregon, June 28 to July 2. Those attending may wish to include attendance at the Conference on Curriculum and Guidance to be held at Stanford University, Palo Alto, California, July 6-10.

According to a release from the U. S. Department of Agriculture, dated January 29, 1936, the Argentine government has authorized the construction of 14 new public terminal port elevators. Their total capacity is 24,030,000 bushels of wheat. In addition, 180 new public country elevators are to be built and the existing country grain storage facilities are to be remodelled. For the most part in the past, the sacked grain at threshing is hauled in carts or trucks to the railway storage bins whose capacity is 7,500,000 metric tons. Since the average annual production of grains and linseed is 18,000,000 tons, grain buyers during heavy marketing must pile some of the sacked grain in the open along the tracks. Altho this method of handling grain has been economical, it is unsatisfactory for marketing grain on the basis of the new grade standards recently put into effect.

Santo Domingo, the capital of the Dominican Republic, is now to be called Cindad Trujillo, in honor of the nation's president and dictator.

Summer schools abroad are becoming more popular each year. The length of each session varies from ten days to several months. There are no entrance requirements. The courses are not designed to give students credit in the American sense of the word, but rather to give an opportunity to study the language of a particular country and gain a general idea of the history, culture, ideals and national life of the people. Excursions supplement the class work. For further in formation write the Institute of International Education, 2 West 45th St., New York City. The Committee on Cultural Relations with Latin America, 289 Fourth Avenue, New York City, also announces its eleventh Seminar in Mexico to be held in Cuernavaca and Mexico, D.F. in July and August. Post-Seminar trips are optional.

A collection of books dealing with Svalbard (Spitsbergen), many of them rare, was recently given to the library of the Michigan College of Mining and Technology, Houghton, by the estate of John M. Longyear, well-known engineer who died on May 28, 1922. The volumes, ranging in date of publication from the seventeenth to the present century, were gathered by Mr. Longyear while he was developing the coal-mining possibilities of the islands.

Capitalizing on its superb setting between two lakes bordered by wooded mountains embracing a meadowlike plain with an amphitheatrical incline, as well as on its historical and legendary background, Interlaken, Switzerland, will again this summer, June 12—Sept. 13, on Sunday afternons, be the host at the open-air performances of Schiller's "William Tell." There will be about 350 amateur actors recruited from the city and its environs.

What a modern highway can do to help develop a port with an excellent harbor but backed by a steep mountain range that has never been pierced by a railroad leading to a productive hinterland is illustrated at Acapulco, Mexico. During the Spanish occupation it was well-known that this was Mexico's best west coast harbor. From it developed the "Camino Real," a very difficult roadway over which went mule caravans with the luxuries of the Orient to Mexico, D.F. and thence to Vera Cruz. Then it lost to other port cities to which railroads could be built because of more accessible valleys whose bottoms afforded roadbeds with easy gradients leading to the capital. However, following the construction of the new highway to Mexico, D.F., Acapulo now is a port of call for steamships between New York and California discharging passengers who can motor to the interior and thence entrain for other parts. Then, too, motorists are attracted there by its bathing beaches, tropical setting, fishing and hunting attractions.

Last fall, the great geographical publications house of Justus Perthes, Gotha, Germany, celebrated its one hundred and fiftieth anniversary.

Last year the Peruvian Central Highway was opened to traffic by the Peruvian Government. It connects Callao and Lima with Oroya where it joins another highway which ultimately will extend to Pucallpa, a port on the Ucayali River where steam navigation connects with the Atlantic via the Amazon. The Central Highway from Lima ascends the mountains along the Rimac River and crosses them at an elevation of 15,889 feet, roughly paralleling the Central Railroad. It traverses the richest crop and stock producing parts of Peru, the largest ore smelters and concentration plants, and when completed to Cerro de Pasco, the richest mineralized section. To the tourist it is most attractive due to the diversity of landscapes typical of the coast, hills, and mountains, and the variety of native vegetation and crops reflecting the varying climatic conditions, all experienced in a relatively short journey.

INTEREST-STIMULATING DEVICES

A Winter Market Bulletin

While studying the chief uses of farm lands in the United States it is very beneficial for the class to keep watch of the wholesale market products listed at least once a week in the daily newspaper. This especially is helpful in learning the sources of our winter vegetables and fruits. A committee can pin such a clipping over the home area on a large map bulletin. Paste or pin pictures of vegetables and fruits, cut from seed catalogs or old magazines, over correct sources of these winter market supplies. With the aid of string and pins connect the product at its source with the market. Added interest will result if pictures showing culture of crops are mounted around border of map. Means of transportation utilized in the rapid movement of fresh market products should, also, be pictured.

A class notebook or table exhibit can be made in place of bulletin. Encourage pupils to form the habit of taking "snaps" of uses of crop lands and products. These pictures should be entered in an album, dated, and fully captioned for future use.

An Activity of the Travel Club

One of the first demands of the travel club, that is newly formed each year, is that we study the common minerals of this locality. Careful examination of each mineral is made to ascertain some of its chief characteristics as luster, color, streak, tenacity, form, cleavage, fracture, and other properties. These characteristics are carefully charted. Numerous field trips are taken to test the ability of pupils in identification. Individual collections are made, classified, labelled, and placed in partitioned boxes. These boxes or trays are made by the pupils. Pupils are trained not to allow rubbing together of specimens so injuring them. It is surprising how much these collections are prized and actually form the beginning of larger and more valuable collections. The New England section is especially favored by having a very complicated rock structure, as well as the aid of the continental ice sheet, so perhaps has a wider variety of minerals than many parts of the country.

Weather Predictions

Great is the joy when correct prediction of the weather is made in the junior high school department. An elementary understanding was gained thru the study of the behavior of the air when heated, clouds, winds, humidity, cyclones, anticyclones, showers, thunderstorms, generalized paths of summer and winter storms, etc. The local weather bureau was visited so that a careful examination of the instruments could be made. Daily copies of the weather map published by the government weather bureau were procured and posted. Predictions are daily made for two twelve-hour stretches—from 8:00 P.M. that night until 8:00 A.M. the next morning, and from 8:00 A.M. the next morning until 8:00 P.M. the next night. No predictions are accepted after the noonday recess. The secretary enters these predictions on a chart posted in the classroom. A committee checks these with the report printed in the daily newspaper. Each pupil reckons his percentage correct at the end of the month.

State Teachers College ANNA E. SIMMONS
Fitchburg, Mass.

GEOGRAPHICAL PUBLICATIONS

C. Warren Thornthwaite. **Internal Migration in the United States.** 52 pp., 9 plates (maps), 5 figures, many grafs and tables. 1934. $1.00

Carter Goodrich, Busrod W. Allin, Marion Hayes. **Migration and Planes of Living 1920-1934.** 111 pp., 1 plate (maps), 13 figures (several small scale maps), 16 tables. 1935. $1.00

Daniel B. Creamer. **Is Industry Decentralizing?** 105 pp., 1 chart, 30 tables. 1935. $1.00

University of Pennsylvania Press, Philadelphia, Pennsylvania.

These bulletins are published as partial findings of the "Study of Population Redistribution" now going forward under the Industrial Research Department, Wharton School of Finance and Commerce, University of Pennsylvania. The study is commissioned "to make a reconnaissance study of the field of internal migration in the hope of discovering bases for the determination of public policy."

Delving into a mine of recalcitrant statistics, the authors have brought forth nuggets of significant fact, mounted them in map mosaics, grafs, or statistical tables, and turned on them the floodlights of brilliant analyses. Discussion is confined largely to analysis of facts, and there is definite disclaimer of desire to predict the future. "Bases for the determination of public policy" are eminently discernible in the materials presented. Cartographic and statistical problems are handled with skill.

Thornthwaite's scholarly volume contains 69 maps showing phases of migration in the United States. Factors indicated as affecting migration include: colonization of new land, population increase, mechanization of agriculture, improved transportation, and industrial development. Among many trends mapped are: movement of whites westward, movement of whites cityward, movement of Negroes northward, gain or loss thru migration in selected states by counties, and, for one state, year to year changes in population. Much of the treatment is highly geographic.

The second volume handles deftly the difficult problem of establishing criteria for "planes of living." It studies, among others, this question: "Have those who moved gained or lost?" Among other notable statements is the following: "Greater increase in population in poor-land areas than in good-land areas during the depression has both long-time and emergency implications for those concerned with land planning and population redistribution." Geographers are indubitably concerned with these problems.

"Is Industry Decentralizing?" has valuable tables for the economic geographer and an invaluable map "Industrial Areas and Important Industrial Counties." The author distinguishes between "Diffusion" of industry from cities into suburbs and other areas where there is already industrial development and "Dispersion" of industry outside the areas of even moderate industrial concentration. Assuming that the latter movement is what is commonly meant by "decentralization of industry," he indicates that, "The results of this investigation can give but little comfort to the more extreme decentralizers." He does note a "diffusion" of industry from cities to suburbs and other areas within the 200 industrial counties.

The three excellent volumes have materials most valuable for courses in the geography of the United States, offer unexcelled bases for understanding the problems presented, and suggest possibilities for further research.

State Teachers College,
Indiana, Pennsylvania
L. C. DAVIS

The JOURNAL *of* GEOGRAPHY

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Professor Kemp is a member of the staff of the geography department at Harvard University and has done extensive field work thruout Europe. Brittany: The Backward Child of a Stern Environment, appeared in September, 1930.

This is the first of a series of articles on Europe.

Why Failures in the Study of Geography? By H. H. Hahn..... 225

Dean Hahn is Superintendent of Training School, State Teachers College, Wayne, Nebraska and the author of numerous books and magazine articles in the field of educational procedure. He is also joint author with Dr. Lackey of "Scales for Measuring the Ability of Children in Geography."

Columbia River Dams at Bonneville and Grand Coulee. By O. W. Freeman 234

Dr. Freeman is chairman of the Natural Science Department at the State Normal School, Cheney, Washington; the author of several books; and a frequent contributor to the field of geographic education. Many of his contributions have appeared in the JOURNAL.

The Artificial Pearl Industry of Cape Cod. By Minnie E. Lemaire 243

Dr. Lemaire is an instructor in the State Teachers College, at La Crosse, Wisconsin.

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